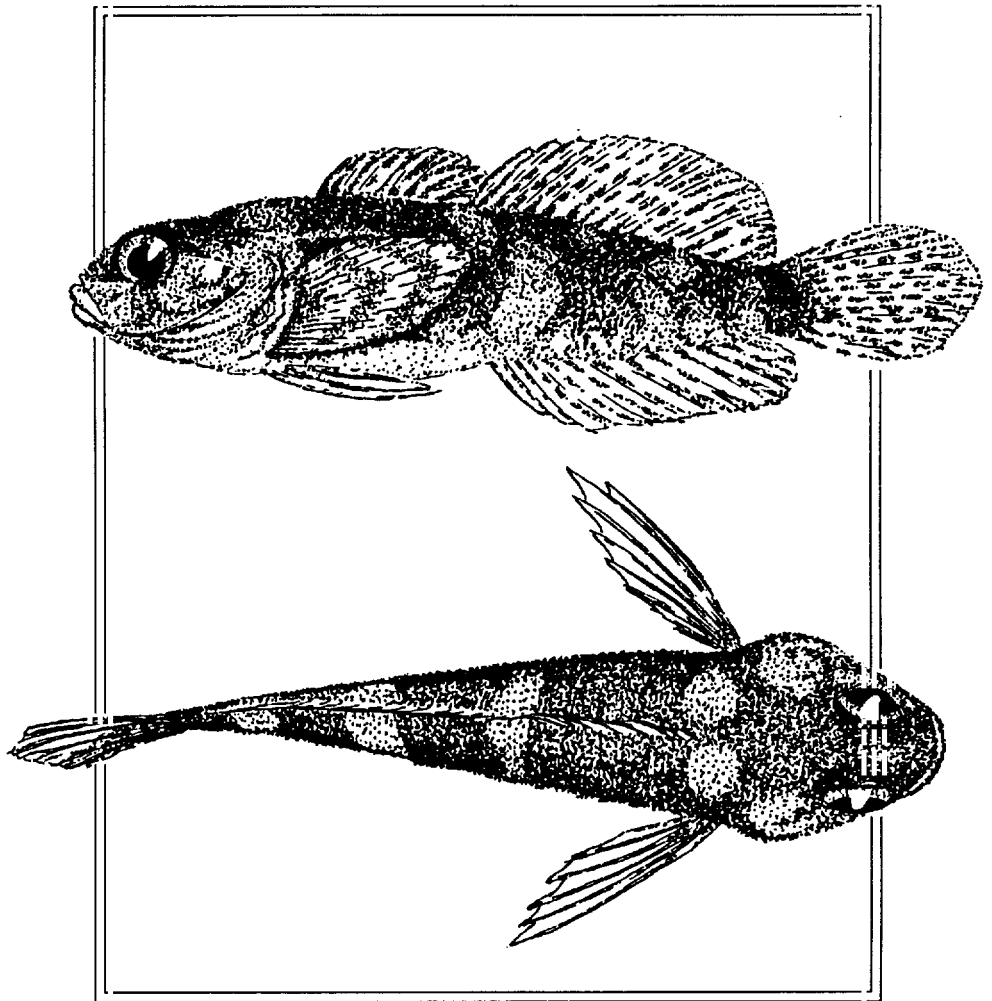


RECOVERY PLAN

Pygmy Sculpin/Cottus pygmaeus



U.S. Fish and Wildlife Service



PYGMY SCULPIN

(Cottus pygmaeus)

Recovery Plan

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Approved:


Regional Director, U.S. Fish and Wildlife Service

Date:

August 6, 1991

Recovery plans delineate reasonable actions which are believed to be required to recover and/or protect the listed species. Plans are prepared by the U.S. Fish and Wildlife Service, sometimes with the assistance of recovery teams, contractors, State agencies, and others. Objectives will only be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints. Recovery plans do not necessarily represent the views, nor the official positions, or approvals of any individuals, or agencies, other than the U.S. Fish and Wildlife Service, involved in the plan formulation. They represent the official position of the U.S. Fish and Wildlife Service only after they have been signed by the Regional Director, or Director as approved. Approved recovery plans are subject to modification as dictated by new findings, changes in species' status, and the completion of recovery tasks.

Literature citation should read as follows:

U.S. Fish and Wildlife Service. 1991. Pygmy Sculpin (Cottus pygmaeus)
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EXECUTIVE SUMMARY

Current Species Status: The pygmy sculpin is a threatened species known only from Coldwater Spring and its run in Calhoun County, Alabama. The Spring run population has been estimated at 2,500 individuals. No estimate of the population in Coldwater Spring has been made. The sculpin is most susceptible to ground water degradation from activities in the recharge area for Coldwater Spring. The Spring and its run are owned and protected by the Anniston Water and Sewer Department.

Habitat Requirements and Limiting Factors: Habitat requirements have not been determined, beyond some characteristics of Coldwater Spring. It is not known if these characteristics represent limiting factors.

Recovery Objectives: (1) Prevent the pygmy sculpin from becoming endangered. (2) Delist the pygmy sculpin.

Recovery Criteria: The first recovery objective will be satisfied when all recovery tasks have been fully implemented. The pygmy sculpin will be considered for delisting when all recovery tasks have been fully implemented and 5 years of consecutive data indicate the existence of five or more protected, viable populations in separate drainages fed by three or more separate aquifers.

Actions Needed:

1. Survey known and potential habitat for additional populations and potential transplant sites.
2. Protect and secure the pygmy sculpin; its habitat; and the surface and subsurface drainage systems that support them.
3. Investigate and implement feasible methods of increasing the quantity and quality of pygmy sculpin habitat.
4. Develop and implement a strategy to rescue the species in the event Coldwater Spring becomes unsuitable habitat.

Total Estimated Cost of Recovery: Implementation of recovery tasks, for which cost estimates can be made, over the initial 3-year period of the recovery effort total \$90,000.

Date of Recovery: Not determinable until further study.

I. INTRODUCTION

Background

The pygmy sculpin (Cottus pygmaeus), as characterized by Bailey and Bond, is a member of the C. bairdi species group according to Williams (1968). Members of this group usually require colder water than other freshwater sculpins. The pygmy sculpin was first collected from Coldwater Spring, Calhoun County, Alabama, in 1963 and described in 1968 (Williams 1968). It was probably isolated in Coldwater Spring as a result of contraction of its formerly wider range. This contraction may have been initiated by the gradual warming during a pre-Wisconsin interglacial period (Williams 1968). Once the species became isolated in the spring, genetic changes, caused by environmental selection, occurred and became fixed. The reduced size of the pygmy sculpin in relation to other sculpins may be the result of this environmental selection.

Numerous Federal Register publications have included this species. All of the previous actions were related to its listing and are noted in the September 28, 1989, Final Rule that determined this species to be threatened (U.S. Fish and Wildlife Service 1989) under the Endangered Species Act of 1973, as amended.

Description

This species rarely exceeds 45 millimeters (mm) or 1.8 inches (in) in total length. The head is large, body moderately robust, and the lateral line is incomplete. Coloration varies by sex, maturity, and breeding condition, while pigmentation is generally consistent (Williams 1968). Pigmentation generally consists of up to three dorsal saddles and mottled or spotted fins. Juveniles have a grayish black body with three light colored saddles. Upon maturity, the body color becomes lighter, and the grayish black color that remains forms two dark saddles. In juveniles, the head is black, changing to white with small scattered melanophores in adults. In breeding males, the dark spots in the spinous dorsal fin enlarge and become more intense and the fin margin becomes reddish orange. The entire body becomes suffused with black pigment which almost completely conceals the underlying pattern. The breeding color of females tends to be slightly darker than in non-breeding females.

Distribution

The only known population of pygmy sculpins is in Coldwater Spring and the Spring run in Calhoun County, Alabama (Figure 1). Coldwater Spring is impounded to form a pool of over 0.4 hectares (one acre), 0.6 to 1.2 meters (m) or 2 to 4 feet (ft) deep (McCaleb 1973). The Spring run is up to 18 m (60 ft) wide and 152 m (500 ft) long to its confluence with Dry Creek. Below this confluence, the stream is known as Coldwater Creek until it joins Choccolocco Creek, a tributary of the Coosa River. The Spring flows from the brecciated zone of the Jacksonville fault in the Weisner formation (Williams 1968, McCaleb 1973, Scott et al., 1987). The average flow is 121 million liters (32 million gallons) per day with a fairly

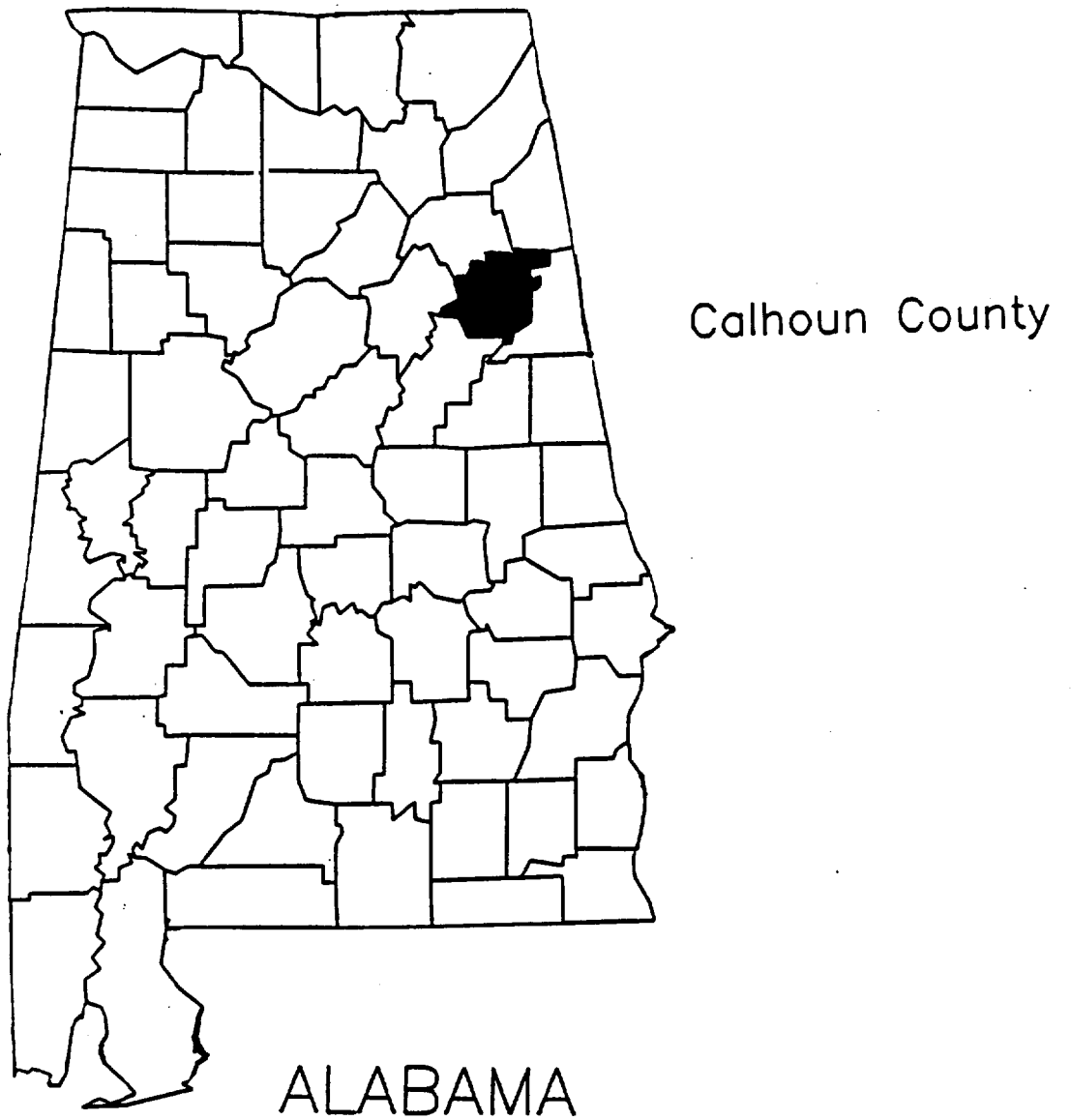


Figure 1: Known Range of Pygmy Sculpin

temperature of 16° to 18° C (61° to 64° F). The bottom is gravel and sand with large rocks where the Spring boils occur. Large mats of vegetation are present in the Spring pool and along the edges of the Spring run. Water, surplus to the needs of the Anniston Water and Sewer Department, flows over a low weir dam that is approximately 6.7 m (22 ft) wide, to form the Spring run. The downstream limit of the pygmy sculpin population occurs at the confluence of Dry Creek. This small stream drains the area of Anniston Army Depot and of a clay mining operation. Water quality degradation has been a long-term problem in Dry Creek. Historic records are not available to document if the pygmy sculpin occurred below the confluence of Dry Creek prior to the water quality degradation.

The City of Anniston owns Coldwater Spring, the Spring run, and approximately 97 hectares (240 acres) of land in the immediate area. The Spring pool serves as the primary water supply for Anniston with an average daily withdrawal of 62 million liters (16.5 million gallons) (Scott et al., 1987). The recharge area for Coldwater Spring is estimated at 233 square kilometers (90 square miles) (Scott et al., 1987). This area includes portions of Anniston Army Depot, Fort McClellan, the Cities of Anniston and Jacksonville, several smaller towns, and private lands.

Life History/Ecology

The most comprehensive study of ecology and life history was conducted by McCaleb (1973). Isopods were found to be the most important food item throughout the year with gastropods and amphipods of seasonal importance. Williams (1968) reported snails as a part of the diet. This small fish apparently spawns throughout the year with a peak from April to August (Williams 1968, McCaleb 1973). Males and females reach sexual maturity at 25-29 mm (1.0-1.1 in). The total number of ovarian eggs varies from 18 to 59, with the number of eggs directly related to individual size (McCaleb 1973). The eggs are laid in masses on the underside of rocks and bricks in clumps of one to nine. They are pale yellow to orange and may number over 200 on a nest (McCaleb 1973). More than one female may deposit eggs in a nest. The incubation period for the pygmy sculpin is unknown. Fry measure 5.3 mm (0.2 in) total length and are well-developed and pigmented.

McCaleb (1973) estimated the population in the Coldwater Spring run at 2,250 to 2,700, based on methodology for density estimates of C. bairdi in a small Montana stream. He did not estimate the number of sculpins in Coldwater Spring proper.

Adult sculpins occasionally feed upon C. pygmaeus eggs. The grass pickerel, Esox americanus, is the only other known predator. Large water snakes often bask in the sun below the Spring weir and pygmy sculpins could be a favored prey (McCaleb 1973).

Reasons for Listing

The threat from ground water degradation is potentially the most serious. Trichloroethylene is present in Coldwater Spring at low concentrations (Environmental Science and Engineering, Inc., 1986). This chemical is present in the subsurface water on the Depot in strong concentrations and may be moving through the aquifer to Coldwater Spring (Kangas 1987). However, the basis for attributing the entire pollution of Coldwater Spring to the Depot is not conclusive. There are low concentrations of other contaminants in the aquifer at the Depot which have not been reported from Coldwater Spring (Kangas 1987). Other sources within the 233 square kilometer (90 square mile) recharge area may be contributing to pesticide levels in the Spring. Surface water contamination may be preventing the sculpin from occupying potential habitat in Dry Creek. The sculpin occurs in the Spring run to the confluence of Dry Creek and sometimes below this point in the spring water that has not mixed with water from Dry Creek (Williams 1968, McCaleb 1973). Dry Creek receives runoff from the Anniston Army Depot and from a clay mining operation.

Collection of this species could be a limiting factor due to its very restricted habitat. As long as the Anniston Water and Sewer Department manages Coldwater Spring, it is unlikely that collecting will pose a serious threat because access is controlled.

Coldwater Spring is the principal water supply for the City of Anniston. The final determination of threatened status includes a special rule for the continued use of the Spring for this purpose. However, at least 3 cubic feet per second must flow over the weir and down the Spring run. Even during the drought of the mid-1980's, the City did not draw the Spring below this minimum. If withdrawal of water from the Spring was sufficient to reduce overflow to below the minimal level of overflow for prolonged periods, it is probable the Spring run population of this species would be adversely impacted.

Conservation Measures

The Anniston Army Depot is working on methods to remove trichloroethylene and other contaminants from the aquifer under the Depot. Unless this adversely impacts the Spring flow, it is expected the cleanup actions will benefit the sculpin. As a component of their aquifer cleanup activity, the Depot is monitoring the quality of water in the aquifer from both on-depot and off-depot wells.

The U.S. Geological Survey has delineated the area that is believed to be the recharge area for Coldwater Spring (Scott et al., 1987). This area is some 233 square kilometers (90 square miles) and includes a portion of the Depot, the City of Anniston, Fort McClellan, the City of Jacksonville, and other suburban areas.

Prior to listing the pygmy sculpin, the Fish and Wildlife Service alerted the Federal Highway Administration and the Alabama Highway and Transportation Department to the potential impacts of a roadway being considered proximate to Coldwater Spring. This conference resulted in consideration of other routing alternatives. If an alternative is selected that may affect the pygmy sculpin, it will be subject to Section 7 consultation.

II. RECOVERY

A. Objective and Criteria

The objectives of this plan are: (1) to prevent the pygmy sculpin from becoming endangered, and (2) to delist the pygmy sculpin. The first recovery objective will be satisfied when all recovery tasks have been fully implemented. Delisting should be considered when all recovery tasks have been fully implemented and five years of consecutive data indicate the existence of five or more protected, viable populations in separate drainages fed by three or more separate aquifers.

Protected is defined as having enough control over the area of surface drainage and groundwater recharge supporting the aquatic habitat so that adverse impacts are unlikely to occur.

A viable population is defined as having the reproductive capability to sustain itself in perpetuity without immigration of individuals from other populations.

These recovery criteria are preliminary and may be revised on the basis of new information.

B. Narrative Outline for Recovery Actions Addressing Threats

1. Monitor population and survey potential habitat for additional populations and potential transplant sites. The number of pygmy sculpins in the Spring and Spring run has never been determined by a systematic survey. Only the Spring run estimate of McCaleb (1973) is available. Population status and trends must be known to monitor recovery and the impact of any adverse actions that may occur. Potential habitat throughout the Coosa River basin should be systematically surveyed for the presence of pygmy sculpins and for potential transplant sites.

1.1. Determine population levels in Coldwater Spring and the Spring run. A systematic method of surveying the population should be developed and a survey conducted twice annually for 3 years to establish a baseline for future monitoring. The survey method should be developed in coordination with the Anniston Water and Sewer Department and be applicable in a manner that will not impact the use of this Spring as a water supply. The relative number of adults to juveniles should be determined, if possible.

1.2. Monitor population trends in Coldwater Spring and the Spring run. Following development of a population survey method and determination of population baseline data, the population should be surveyed at not more than 2-year intervals using the methodology developed under Task 1.1. Results of the surveys

and the population baseline data should be compared to determine population trends.

- 1.3. Survey Springs for the occurrence of this species. Systematic surveys of Springs within the Coosa River drainage system should be conducted to determine if other populations of this species exist. Apparent suitable habitat should be identified and documented as potential transplant sites.
2. Protect and secure the pygmy sculpin; the quantity and quality of its habitat, and the quantity and quality of surface and subsurface drainage systems that support them. The pygmy sculpin cannot be considered for delisting until the entire population and its supporting habitat can be protected.
 - 2.1. Monitor sub-surface water quality and movement of any contaminants noted. Monitoring of the presence and movement of contaminants from the Anniston Army Depot in the aquifer supplying Coldwater Springs should be continued from on-depot and off-depot wells. If contaminants are determined to be moving toward Coldwater Spring, implementation of contingency plans developed under Task 4 should be considered.
 - 2.2 Use applicable laws and regulations to protect the sculpin and its habitat. Available legislation and regulations should be used to prevent further contamination of pygmy sculpin habitat and to achieve the timely cleanup of existing and future problems. Any plans to develop the recharge area of any aquifer contributing to pygmy sculpin habitat should be closely evaluated to assure identification and implementation of alternatives that protect the Spring and the sculpin.
 - 2.3 Contact landowners and negotiate protection. The landowner of the currently occupied site and any future occupied sites should be encouraged to protect pygmy sculpins on land they own or manage. Long-term protection efforts, exclusive of Section 7, may include land donations, fee acquisitions, conservation easements, or other methods. Short-term protection methods should be viewed as interim steps toward more permanent protection; however, short-term strategies may be the only alternative if private landowners are not agreeable to, or monies and not available for, more permanent protection measures.
3. Investigate and implement feasible methods of increasing the quantity and quality of pygmy sculpin habitat. The entire known population of pygmy sculpins occurs at the Coldwater Spring site. This makes the species highly vulnerable to threats. Occupation of additional sites in separate drainages and fed by different aquifers would reduce its vulnerability considerably and would provide a

source of pygmy sculpins for reintroduction to Coldwater Spring, should that be necessary. Increasing the productivity of the habitat at Coldwater Spring run will provide for taking fish from the Spring and its run for transplantation to other suitable sites that may be identified through Tasks 1.3 and 3.2.

- 3.1 Enhance the habitat at the Coldwater Spring run. Pygmy sculpins seem to be more abundant in Coldwater Spring than in the Spring run. This could be due to Coldwater Spring's slower current, more cover, increased food source, more stable water levels, or some combination of factors. This task should construct a low weir in the Spring run to develop habitat that simulates that in Coldwater Spring. The weir should only elevate the water level a few inches and should initially be temporary to allow for removal, with minimal disturbance, should the habitat or sculpin be adversely impacted. After a period of evaluation, additional weirs may be constructed to create a series of pools in the Spring run if this proves to benefit the sculpin. Determination of baseline population data and trends as discussed earlier will be necessary before this task is accomplished.
- 3.2. Investigate the feasibility of establishing other populations. The most feasible way to achieve long term protection for the pygmy sculpin is to establish additional populations in springs outside the Coldwater Spring recharge area. This task should analyze water chemistry, habitat, and other parameters of Coldwater Spring. This information and that gathered during the conduct of Task 1.3. should be used to identify four or more other springs within separate tributaries of the Coosa River drainage system, fed by three or more separate aquifers, as potential transplant sites.
- 3.3. Establish populations of the pygmy sculpin outside Coldwater Spring. If Task 3.2 demonstrates this to be feasible, a plan to establish four or more additional populations within separate tributaries of the Coosa River drainage system and fed by three or more separate aquifers should be developed and implemented.
4. Develop a strategy for rescue of pygmy sculpins in the event Coldwater Spring becomes unsuitable habitat. A plan should be developed to rescue sculpins in the event Coldwater Spring becomes unsuitable habitat and to reintroduce them if that habitat is subsequently restored. The plan should be implemented if necessary to ensure the continued survival of this species if a short-term catastrophe occurs at the only historic site. All planning and implementation should be done in coordination with the Anniston Water and Sewer Department.

C. Literature Cited

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U.S. Fish and Wildlife Service. 1989. Endangered and threatened wildlife and plants; determination of Cottus pygmaeus (pygmy sculpin) to be a threatened species. Federal Register 54(187):39846-39850.

Williams, J.D. 1968. A new species of sculpin, Cottus pygmaeus, from a spring in the Alabama River Basin. Copeia 2:334-342.

III. IMPLEMENTATION SCHEDULE

Recovery Action Priorities

- Priority 1 - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.
- Priority 2 - An action that must be taken to prevent a significant decline in species population/habitat quality, or some other significant negative impact short of extinction.
- Priority 3 - All other actions necessary to meet the recovery objectives.

Acronyms Used

- FWE - Fish and Wildlife Enhancement (Endangered Species Division)
LE - Law Enforcement
ADCNR - Alabama Department of Conservation & Natural Resources
AAD - Anniston Army Depot
ADEM - Alabama Department of Environmental Management
AWSD - Anniston Water and Sewer Department
EPA - Environmental Protection Agency
ANHP - Alabama Natural Heritage Program
TNC - The Nature Conservancy

IMPLEMENTATION SCHEDULE										
PRIORITY #	TASK #	TASK DESCRIPTION	TASK DURATION	RESPONSIBLE PARTY			COST ESTIMATES (\$K)			COMMENTS/NOTES
				USFWS		Other	FY 1992	FY 1993	FY 1994	
				Region	Program					
2	1.1	Survey known population number	3 years	4	FWE	ADCNR	4	4	4	
2	1.2	Monitor population trends	Biennially	4	FWE	ADCNR	-	-	-	Initiated after completion of Task 1.1
2	1.3	Survey for more populations	1 year	4	FWE	ADCNR	25			
2	2.1	Monitor aquifer contamination	continuous	4	FWE	AAD AWSD				Task being done by AAD
2	2.2	Enforce legal protection	continuous	4	FWE LE	ADEM EPA AWSD				Cost is too unpredictable to determine
2	2.3	Contact landowners and negotiate protection	1 year	4	FWE	ANHP TNC			3	
2	3.1	Enhance pygmy sculpin habitat	1 year	4	FWE	ADCNR AWSD	5	5	5	
2	3.2	Investigate establishing other populations	1 year	4	FWE	ADCNR	5	5	5	
2	3.3	Establish other populations	1 year	4	FWE	ADCNR	5	5	5	Initiate after completion of Task 3.2
2	4	Develop pygmy sculpin rescue plan	1 year	4	FWE	ADCNR AWSD	5			

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